MEMORANDUM

Missouri Department of Transportation
Design
General Headquarters

TO: All General Headquarters and District Offices

FROM: Diane Heckemeyer
State Design Engineer

DATE: March 15, 2004

SUBJECT: Design
Development Manual Letter No. 1, 2004
Project Development Manual Revisions

Questions concerning the Project Development Manual revisions should be directed to General Headquarters, Design Standards Section, Dan Tschirgi (573) 526-2924 or Bruce Green (573) 751-9248.

NOTE	EXPLANATION
1	The following revisions are the result of specification revisions that will be effective July 1, 2004 as well as numerous other changes to design criteria. Changes related to specification revisions are identified, so that those changes will not be used in projects until July 1, 2004. Other changes are effective immediately.

ITEM	DESCRIPTION OF REVISION
Volume I Table of Contents	Revision dates changed for appropriate sections.
Chapter I Table of Contents	Revisions made to the table of contents corresponding with section and figure revisions.
Section 1-02	Section 1-02 has been extensively rewritten and retitled to "Needs Identification, Project Scoping and STIP Commitments." This section describes the project scoping process, the associated programming changes, and a new planning framework. It is intended to provide sufficient information for project development staff to develop projects. A more detailed description of the planning framework is under development by GHQ Transportation Planning.
Figure 1-02.1	The thickness of the unbonded concrete overlay thickness for preliminary cost estimates has been changed from 9 inches to 8 inches. The unbonded concrete overlay is specified as 8 inch although the actual average thickness is approximately 9 inch. Also, costs were added for a 12 inch superpave overlay and rubbilization.
Figure 1-02.2	This is a new figure with a flow chart of the project scoping process. The former Figure 1-02.2 has been renumbered to Figure 1-02.7.

ITEM	DESCRIPTION OF REVISION
Figure 1-02.3	This is a new figure titled "Sample Draft Project Scoping Memorandum." The Draft Project Scoping Memorandum is currently available as a Word design form.
Figure 1-02.4	This is a new figure titled "Sample Project Scoping Memorandum." The Project Scoping Memorandum is currently available as a Word design form.
Figure 1-02.5	This is a new figure titled "Sample Non-Major Project Scope/Estimate Change Memorandum." This document will be added to the Word design forms.
Figure 1-02.6	This is a new figure titled "Sample Major Project Scope/Estimate Change Memorandum." This document will be added to the Word design forms.
Figure 1-02.7	This figure titled "When to Turn in a Project Amendment Tracking System (PATS) Form," has been renumbered from Figure 1-02.2 to Figure 1-02.7. It has been revised to contain the current programming process described in Section 1-02.
Figure 1-02.8	This is a new figure titled "Project Estimate Quality Assurance Report." Use of this form for quality assurance reviews by the GHQ Technical Support Engineers is described in Subsection 1-02.12(7).
Section 1-03	Subsection 1-03.4 Consultant Evaluations has been added with new criteria for completing consultant evaluations, developed by the Project Managers Coordination Team. Project managers are responsible for completing consultant evaluations on all projects.
Chapter II Table of Contents	Revisions made to the table of contents corresponding with section and figure revisions.
Section 2-01	References to access management have been added to Subsections 2-01.2, 2-01.3(5) and 2-01.9, and a link to the Access Management Guidelines on the internet has been added to Subsection 2-01.9. In Subsection 2-01.13, guidance for the project scoping checklists has been moved to Section 1-02. Additional revisions to Section 2-01 for project scoping are under development.
Figure 2-01.1	In the Conceptual Study Report form, the cost information has been revised to be conceptual costs only, consistent with the project scoping process. Also, a reference to access management consideration has been added. The Word design form has been revised accordingly.
Figure 2-01.2	In the 3R Conceptual Study Report form, the cost information has been revised to be conceptual costs only, consistent with the project scoping process. Also, a reference to access management consideration has been added. The Word design form has been revised accordingly.

Figure 2-01.6	In the 4R Conceptual Study Report form, the cost information has been revised to be conceptual costs only, consistent with the project scoping process. Also, a reference to access management consideration has been added. The Word design form has been revised accordingly.
Figure 2-02.1	In the Location Study Report form, the cost information has been revised to be conceptual costs only, consistent with the project scoping process. Also, a reference to access management consideration has been added and the accident data type has been updated. The Word design form will be revised accordingly.
Section 2-03	In Subsection 2-03.5, the reference to the "project summary sheet" has been revised to the current "Request for Approval of Location and/or Design of Highways."
Figure 2-03.5	This figure has been revised with a blank "Request for Approval of Location and/or Design of Highways." A form with detailed instructions will be added to the Word design forms.
Section 2-06	In Subsection 2-06.3(4), the note for preliminary plans has been slightly modified by adding "as well as other property interests." In Subsection 2-06.6, the definition of a full federal oversight project has been removed and a reference added to Subsection 1-04.2. In Subsection 2-06.9 the guidance for the project scoping memorandum has been moved to Section 1-02.
Section 3-02	The size and method of setting a 3D control point is clarified in Subsection 3-02.5(3). A 15 inch by 3/8 inch steel rod or a 100d is used.
Chapter IV Table of Contents	Revisions made to the table of contents corresponding with section and figure revisions.
Section 4-01	In Subsection 4-01.3(1), the following statement was removed: "The requirements of the standard specifications are of primary importance; the instructions in this manual are of secondary importance." Guidance has been added as Subsection 4-01.6 for the core team to conduct a post design meeting. The meetings are intended to improve the scoping and design of future projects.
Section 4-02	Items for removal of improvements in Subsection 4-02.14 have been revised for specification revisions.
Section 4-03	In Subsection 4-03.4 (2), a clarification of the Form D-2BS has been added. Subsection 4-03.6 has been revised to instruct designers to state what type of coordinates are used on the referenced points sheet. Either MoDOT modified Coordinates or Missouri State Plane Coordinates may be used. Subsection 4-03.7 has been revised so that at the option of the district, greater accuracy for coordinate points may be achieved by recording up to five decimal places. The reference to proprietary items in Subsection 4-03.13(1) has been revised. In Subsection 4-03.13(1)(b), the list of required job special provisions has been updated for specification revisions. Extensive guidance has been added for the use of a job special provision for very low or very high job complexity. In Subsection 4-

Section 4-03 (cont.)	03.14(1)(d), the guidance for field laboratories has been revised for specification revisions. Only a type 2 field laboratory is specified when needed as determined by the core team. In Subsection 4-03.16, references to the signal and lighting working day and the bridge working day JSPs have been removed. These provisions were added to the specifications. A statement has been added Subsection 4-03.17(5) to clarify that changes to full federal oversight projects should be approved by FHWA before they are issued, consistent with current agreements.
Figure 4-03.5	All signs except for Drive Smart and POP will be contractor furnished, so the costs for the remainder of the commission furnished signs have been removed from this figure.
Section 4-04	Subsection 4-04.5(2) has been revised to state that a barrier height transition should not be used where the posted speed limit is greater than 35 mph.
Section 4-05	New criteria for median acceleration lanes have been added as Subsection 4-05.3(3)(e). The use of median acceleration lanes will require a design exception and a traffic study for the three year period following construction. Extensive new criteria on multi-lane roundabouts have been added as Subsection 4-05.9. Also, the design vehicle requirement for roundabouts in Subsection 4-05.8(6) has been revised so that all roundabouts on the state highway system will accommodate the WB-67 vehicle. Clarifications have been made to Subsections 4-05.8(1), 4-05.8(12) and 4-05.8(16) for roundabouts.
Figure 4-05.13	The chasing arrows sign number was changed from W2-6M to W2-6 to be consistent with the 2003 addendum to the MUTCD.
Figure 4-05.14	This is a new figure for multi-lane roundabouts titled "Typical Maneuvers from an Approach at a Two-Lane Roundabout."
Figure 4-05.15	This is a new figure for multi-lane roundabouts titled "Example of Partial Multi-Lane Roundabouts."
Figure 4-05.16	This is a new figure for multi-lane roundabouts titled "Vehicle Path Overlap at Two-Lane Roundabouts."
Figure 4-05.17	This is a new figure for multi-lane roundabouts titled "Typical Signing and Pavement Marking for Multi-Lane Roundabout."
Figure 4-05.18	This is a new figure titled "Median Acceleration Lane" showing lane width, signing, and pavement marking.
Section 4-06	An addition was made to Subsection 4-06.6(10) for the shoulder width of 4 feet [1.2m] along median acceleration lanes.

Section 4-08	Extensive revisions have been made to Section 4-08 corresponding to revisions to Standard Specification Sec 200. The revisions include, but are not limited to: • Adding class 4 excavation for box culverts (Subsection 4-08.1(2)) • Restoring acreage measurement and payment for clearing and grubbing (Subsection 4-08.2) • Including sandstone and igneous rock in class C excavation (Subsection 4-08.3) • Eliminating measurement and payment for overhaul Subsection 4-08.3(1)(d)) • Establishing distances for linear grading classes (Subsection 4-08.3(2)) • Eliminating shaping shoulders (Subsection 4-08.3(7)) • Defining length of haul for shaping slopes classes (Subsection 4-08.3(8)) Other revisions to improve the guidance have been made to Subsection 4-08.3(1)(a) for undergrading, Subsection 4-08.3(1)(f) for surcharged fills, 4-08.3(8) for shaping slopes, and Subsection 4-08.4(1) for compaction with moisture and density control. New guidance has been added in Subsection 4-08.3(1)(k) for grading projects separate from paving projects and Subsection 4-08.3(1)(l) for temporary shoring.
Figure 4-08.1	This figure showing overhaul has been removed. A more current example showing balance points will be added to Section 4-10 in the future.
Section 4-09	Subsection 4-09.4, Erosion Control, has been revised for clarification and to be consistent with specification revisions. There is only one mulch type in the specifications so references to different mulch types has been removed. Use of the new item drop inlet checks has been added to Subsection 4-09.4(2)(c)2. The guidance for estimating the quantity of temporary seeding and mulching in Subsection 4-09.4(2)(e). Consideration of mid-slope runs of silt fence has been added to Subsection 4-09.4(2)(g). Also, Subsection 4-09.4(2)(h) has been revised to state that erosion control blankets should be considered on fill slopes greater than 10 feet high. Subsection 4-09.5, Embankment Protection, has been revised to be consistent with specification revisions. A reference to concrete aprons has been added to Subsection 4-09.5(2) and (4). A concrete apron adjacent to the bridge wing wall should be used on all bridges as shown on Standard Plan 611.60. Subsections 4-09.5(3) and (4) regarding grouted rock applications have been removed, as these methods are ineffective. New Subsection 4-09.5(5) has been added for gabions. In Subsection 4-09.7(2) for 3R/4R projects, a bullet point was added stating that only new guardrail, not salvage rail, should be used except for height adjustment projects. New Subsection 4-09.7(9), Aesthetic Guardrail, was added for scenic highway projects. In Subsection 4-09.7(10), Bridge Ends, a reference to Standard Plan 606.22 was added for non-standard transitions and slopes for bridge anchor sections. Subsection 4-09.23, Proprietary Items, and Subsection 4-09.24, Public Interest Finding, have been substantially revised. A new procedure is defined that addresses the inability to acquire proprietary items specified in a contract. Also, the use of the term “or equivalent” as a substitute product is defined.

Section 4-09 (cont.)	Subsection 4-09.25 has been revised to state that a pay item is needed for curb ramps. Subsection 4-09.27, Contract Leveling Course Projects, has been revised. The revisions are consistent with the May 28, 2003 General Letter No. 3, with two exceptions. The quantity of constructions signs has been omitted from the third bullet point. This quantity will be adjusted as necessary on the traffic control plans. The fifth bullet point has been revised for bridge overlays. Bridges should be excepted unless prior written approval is obtained from GHQ Bridge and submitted with the transmittal package. Future leveling course letters will primarily contain the pricing information for estimates, and will not duplicate the criteria in the Subsection 4-09.27.
Figure 4-09.6	This figure with seeding rates has been deleted. The seeding recommendation will come from GHQ Maintenance as described in Subsection 4-09.4(1)(c).
Volume II Table of Contents	Revision dates changed for appropriate sections.
Chapter V Table of Contents	Revisions made to the table of contents corresponding with section revisions.
Section 5-05	Subsection 5-05.3(1)(c), Mechanically Stabilized Earth (MSE) Wall Systems, has been revised to be consistent with changes to the terminology and procedural changes in Standard Specification Section 720.
Chapter VI Table of Contents	Revisions made to the table of contents corresponding with section and figure revisions.
Section 6-02	The terminology for underdrainage, pipe aggregate pavement edge drains and cross drains, has been revised to be consistent with revised Standard Specification Sec 605. In Subsection 6-02.3, references to 2 foot rock base have been changed to 18 inch rock base to be consistent with previous revisions to the rock base thickness.
Section 6-03	A rehabilitation strategy for interstate routes has been added to Subsection 6-03.3(2). In Subsection 6-03.3(7), Plans for All Alternate Bids for Pavement Projects, revisions were made consistent with revised Standard Specification Section 403. All pay items for alternate bid full depth pavements are in square yards. Pay items for alternate bids for rehabilitation projects are tons for asphalt and cubic yards for concrete. Guidance for specifying the asphalt mix and lift thickness has been revised in Subsection 6-03.4(3). Only the lift thickness of the surface mixture and binder type of the upper 4 inches need to be specified, as shown on the revised typical sections. For the remaining base for medium and heavy duty pavements, a minimum mixture type is specified and the contractor determines the number of lifts in accordance with the minimum lift thicknesses in Standard Specification Sec 403.
Figure 6-03.6	For flexible pavements, a note has been added for specifying the binder type of the upper 4 inches, in accordance with Table 6-07.1.
Figure 6-03.7	For flexible pavements, a note has been added for specifying the binder type of the upper 4 inches, in accordance with Table 6-07.1.

Figure 6-03.8	For flexible pavements, a note has been added for specifying the binder type of the upper 4 inches, in accordance with Table 6-07.1.
Figure 6-03.9	For flexible pavements, a note has been added for specifying the binder type of the upper 4 inches, in accordance with Table 6-07.1.
Section 6-04	The criteria for placing shoulder rumble strips in Subsection 6-04.6 have been revised. All outside shoulders at least 2 feet wide should receive rumble strips if all other criteria are met.
Section 6-05	In Subsection 6-05.3, Retrofit Geocomposite Pavement Edge Drains, Table 6-05.1 with outlet spacing has been deleted. Spacing for all outlets is shown on Standard Plan 605.10. The guidance for pavement repair in Subsection 6-05.4 has been revised in accordance with revisions to Standard Specification Sec 613. The revisions describe the appropriate use of Class A and Class B full depth, and Class A and Class B partial depth. The criteria for coldmilling in Subsection 6-05.13 has been revised consistent with revisions to Standard Specification Sec 622 and to encourage more consistency in the use of coldmillings in contracts throughout the state. The use of coldmillings will be determined by district operations and the project core team. Also, more emphasis is being placed on recycling coldmilled material. New guidance has been added. Subsection 6-05.17, Retrofit Dowel Bars, describes the use of dowel bars retrofitted to correct working cracks. Subsection 6-05.18, Unbonded Concrete Overlays, describes how quantities should be estimated including establishment of a profile line during the field check. A new Project Development Manual section for preventive maintenance is under development that will consolidate the preventive maintenance guidance.
Section 6-07	Section 6-07 has been substantially revised to be consistent with revisions to Standard Specification Sec 400. Table 6-07.1, Asphalt Binder Selection Criteria, has been revised to indicate where polymer modified asphalt binders are used. Table 6-07.3 has been revised consistent with the new superpave mix designations. As described in Section 6-03, the thickness of the surface mixture and the binder type for the upper 4 are specified. For the remaining base, a minimum mixture type is specified and the contractor determines the number of lifts in accordance with the minimum lift thicknesses in Standard Specification Section 403. Subsection 6-07.9, Road Mixes, was deleted and replaced with Processing Reclaimed Asphalt (reuse of coldmillings). Subsection 6-07.12, Seal Coat, has been retitled as Chip Seal and criteria is provided for specifying the aggregate grades available in revised Standard Specification Sec 409.

Figure 6-07.1	The estimate factors have been substantially revised to be consistent with revised Standard Specification Sec 400. Type 1 and 4 aggregate have been removed. The separate binder and aggregate estimate factors are no longer needed and have been deleted. New factors for plant mix bituminous base course have been added. All of the factors in this figure are statewide average estimates and should be used only for preliminary estimates.
Figure 6-07.2	This figure has been deleted because asphalt mix quantities are no longer calculated based on components.
Chapter VIII Table of Contents	Revisions made to the table of contents corresponding with section and figure revisions.
Section 8-01	Subsection 8-01.2(2)(b) has been revised regarding placement of poles with or without breakaway devices by other political subdivisions. The wording is consistent with the Traffic Lighting Manual. Subsection 8-01.2(3) has been clarified regarding relocating and upgrading poles at the expense of local political subdivisions.
Section 8-02	In Subsection 8-02.7(2)(b), 170 Controllers, the requirement for a job special provision has been deleted. The provisions have been incorporated into the specifications. Subsection 8-02.9(5), Signing a Turn Movement, has been revised by removing the reference to Commission Furnished Signs. In Subsection 8-02.11(4), Microloop Detectors, the requirement for a job special provision has been deleted. The provisions have been incorporated into the specifications. The standard conduit sizes in Subsection 8-02.13(1) have been revised to be consistent with revised Standard Specification Sec 902. Standard conduit size, except those between a loop detector and the first adjacent pull box to the loop detector, is 4 inch. In Subsection 8-02.13(2), a sentence was added to provide for two 4 inch conduits from the first pull box to the controller. In Subsection 8-02.17(8)(b), the last two bullet points were added to provide the lengths of fiber cable needed.
Figure 8-02.9	On Sheet 1 of 8, the heading "Commission Furnished Signs" has been removed from the column for sign numbers from Standard Plan 902.80. These signs will no longer be commission furnished. On Sheet 2 of 8, the standard conduit sizes have been revised according to revisions to Standard Specification Sec 902.
Figure 8-02.14	Table 8-02.6 has been revised for the standard conduit sizes in the revisions to Standard Specification Sec 902.
Section 8-04	This section has been retitled to "Temporary Traffic Control Plans" and completely revised by the Work Zone Quality Circle. Most of the revisions reflect current work zone practices and standards. Also, placement of the Point of Presence sign in Subsection 8-04.2(5)(b) has been revised to state that the sign should be located as close to the project improvements as possible. Revisions to Subsection 8-04.7 pertaining to temporary concrete traffic barrier are accordance with revisions to Standard Specification Sec 617. Subsection 8-04.15(2)

Section 8-04 (cont.)	describes a new item, Work Zone Traffic Signal, which will be in effect with revised Standard Specification Sec 616. Guidance on pavement marking has been moved from Subsection 8-04.5 to a new Section 8-05.
Figures 8-04.1, 8-04.2, 8-04.3, 8-04.4, 8-04.5 8-04.6, 8-04.7 8-04.8,8-04.9 8-04.10, 8-04.11 8-04.12, 8-04.13 8-04.14, 8-04.15 8-04.16, 8-04.17, and 8-04.18	These work zone figures have all been substantially revised to be consistent with current work zone policies.
Figure 8-04.19	The Short Term Marking configurations shown in this figure have been moved to new Standard Plan 620.10. Figure 8-04.19 is a new figure entitled "Intermediate Lane Closure" showing spacing of channelizers and/or barricades placed perpendicular to the flow of traffic to deter non-construction related use of extended lengths of closed lanes.
Figure 8-04.20	The signing and marking of the no center stripe configurations shown in this figure have been moved to new Standard Plan 620.10. Figure 8-04.21 has been renumbered to Figure 8-04.20.
Figure 8-04.21	Figure 8-04.21 has been renumbered to Figure 8-04.20; and Figure 8-04.22 has been renumbered to Figure 8-04.21.
Figure 8-04.22	Figure 8-04.22 has been renumbered to Figure 8-04.21 and not replaced.
Figure 8-04.23	The pavement marking selection figure has been renumbered to Figure 8-05.1.
Section 8-05	Section 8-05, Pavement Marking, is a new section with revised criteria from Section 8-04.5. Improved guidance on appropriate use of different material is provided to supplement Figure 8-05.1. Also, for snowplowable raised pavement markers, Subsection 8-05.2(6) states that they should not be left in place and covered by surface treatment or resurfacing. Subsection 8-05.3, Temporary Pavement Marking has been clarified to state that no direct payment is made for temporary marking for grinding, milling, and resurfacing. Temporary marking should be used with pay items where the traffic pattern has changed during construction due to bypasses, lane shifts, narrow lanes, etc.
Figure 8-05.1	The pavement marking selection chart has been renumbered from Figure 8-04.23 to Figure 8-05.1. Type 2 preformed tape, added to the revised Standard Specification Sec 620, has been added to the selection chart for AADT greater than 80,000 with a note that it is only used for lane markings.

Chapter IX Table of Contents	Revisions made to the table of contents corresponding with section and figure revisions.
Section 9-04	The reference to type 4 mulch has been removed from Subsection 9-04.3(1). There is only one mulch type in the revised Standard Specification Sec 802.
Section 9-08	The permissible pipe types for stormwater conduit have been removed from Subsection 9-08.2(3) and a reference has been made to Subsection 9-10.2(6) where the revised pipe types are described.
Section 9-10	This section has been revised to reflect the a pipe policy developed by a team of MoDOT and industry personnel, and revisions to the Standard Specification in Section 700 pertaining to pipe and end sections: • In Subsection 9-10.2 new pipe groups consist of Groups A, B, and C. Group A includes only concrete and vitrified clay. Group B includes Group A pipe plus polymer coated corrugated metal (new type in specifications), corrugated aluminum alloy, corrugated polyethylene, corrugated PVC (new type in specifications) and corrugated aluminum-coated steel. Group C includes Groups A and B pipe plus corrugated zinc coated metal and corrugated bituminous coated metal. The ADT limits for crossroad culvert pipe groups are in Section 9-10 of the Project Development Manual. • If Group A pipe is used, the class of concrete pipe is specified. Otherwise, Group B or Group C pipe as appropriate are specified. If a particular type of Group B or Group C is unsuitable for a particular location, it may be excluded from the group with a note on the plans or a Job Special Provision as described in Subsection 9-10.2(5). • As described in Subsection 9-10.2(2), the hydraulic design computations for crossroad culvert using Group B pipe and Group C pipe will be performed for both corrugated and smooth wall pipe. The pay item for the corrugated pipe size will be used. At each pipe location on the plans, both the corrugated and equivalent smooth wall diameters will be shown. • As described in Subsection 9-10.2(6), storm sewer pipe under the paved portions of roadways with greater than 3500 ADT must be concrete or vitrified clay. All other storm sewers are Group B pipe. The specifications require that metal pipe from Group B used as storm sewer be smooth wall type. • Subsection 9-10.16 has been revised according to Standard Specification Sec 206 and the pipe specifications. No direct payment is made for trench excavation and backfilling unless included as Class 3 Excavation for specific pipe installation, or for storm sewer, utility, or sanitary sewer. Payment is made for Class 4 excavation, which applies to box culverts.

Figure 9-10.5	This figure has been revised to show class 3 or class 4 excavation as appropriate for the type of excavation.
Contract Time	The production rates have been revised based on survey results from all districts and various labor organizations for the different types of work. Preventive maintenance work types and class 4 excavation for box culverts have been added.
Microstation Design Form D-2BS	This form has been substantially revised by the Work Zone Quality Circle in accordance with the revisions to Standard Specification Sections 616 and 617 and current work zone guidelines. The revised microstation form will be available on district servers by April 5, 2004.
Microstation Design Forms D37A and D37B	On Form D37A, Traffic Signal Quantity Sheet, the heading "Commission Furnished Signs" has been removed from the column for sign numbers from Standard Plan 902.80. These signs will no longer be commission furnished. On Form D37B, the standard conduit sizes have been revised according to revisions to Standard Specification Sec 902. The revised microstation form will be available on district servers by April 5, 2004.
Bid Items	The list of bid items has been revised in accordance with the revisions being issued March 15, 2004. The revised list is effective July 1, 2004

dmt
S:\de_std\2004 DE Std Letters\D200401